

CLAIMS

1. A tool fixing device for a machine tool spindle for releasably fixing a tool mounted on an one end portion of the spindle of a machine tool, the tool fixing device comprising a draw bar capable of being connected to the tool, urging means for urging the draw bar to a tool fixing side, and release means capable of driving the draw bar to a tool release side against an urging force of the urging means, and characterized in that:

the draw bar is provided with a draw bar extension part extending to an outside of the other end face of the spindle;

said urging means comprises a gas spring, connected to the other end of the spindle so as to rotate integrally therewith, for urging the draw bar at the draw bar extension part to the tool fixing side; and

said release means comprises a fluid pressure cylinder connected to an outer end of the gas cylinder capable of driving the draw bar at the draw bar extension part to the tool release side.

2. The tool fixing device for a machine tool spindle according to claim 1, characterized in that said gas spring and the fluid pressure cylinder are connected in relatively rotatable fashion.

3. The tool fixing device for a machine tool spindle according to claim 1 and claim 2, characterized in that the gas spring comprises a cylinder main body externally fitted to the draw bar extension part and connected to the other end of the spindle so as to rotate integrally therewith, a cylinder hole formed in the cylinder main body, a piston part integrally provided in a mid part of the draw bar extension part and mounted in the cylinder hole to be movable, and a gas actuation chamber formed in the spindle side of the cylinder hole with respect to

the piston part and having a compression gas filled therein.

4. The tool fixing device for a machine tool spindle according to claim 3, characterized in that said cylinder hole is formed in a tapered shape of diameter decreasing to the spindle side.

5. The tool fixing device for a machine tool spindle according to claim 3, characterized in that said gas spring comprises an urging member mounted in the gas actuation chamber for urging the piston part to the tool fixing side.

6. The tool fixing device for a machine tool spindle according to claim 3, characterized in that said cylinder main body has a diameter substantially the same or larger than that of the spindle.

7. The tool fixing device for a machine tool spindle according to claim 3, characterized in that said gas spring comprises a sealing member for sealing between the piston part and the cylinder main body, and a lubricating oil for lubricating between the piston part and the cylinder main body and for sealing the compression gas.

8. The tool fixing device for a machine tool spindle according to claim 3, characterized in that said cylinder main body comprises filling ports for filling the gas actuation chamber with the compression gas and the lubricating oil.

9. The tool fixing device for a machine tool spindle according to claim 3, characterized in that a fin for dissipating heat is provided in the outer perimeter part of said cylinder main body.

10. The tool fixing device for a machine tool spindle according to claim 3, characterized in that urging force detection means is provided in said fluid pressure cylinder for detecting the urging force of the gas spring when the draw bar extension part is driven to the tool release side.